

JOB NO.: IGS02-04

W.O. #02-53672

TITLE: Generator Monitoring and Cooling

DESCRIPTION: Install additional generator monitoring systems and increase the generator cooling capacity.

JUSTIFICATION ECONOMIC

PAYBACK PERIOD: 0.28 years

BENEFIT/COST RATIO: 39.46

ECONOMIC LIFE: years

PV SAVINGS: \$

SALVAGE VALUE: \$

ADDITIONAL DETAIL: This project is part of the Turbine Upgrade-Plant Modifications Project. The economic justification is for the entire project, not just for modifications to the generator.

This project includes installation of a field winding monitor, pyrolysis system, stator leak monitoring system, controller for the stator cooling water system and generator capability studies.

COST ESTIMATE:

	<u>2002-2003</u>	<u>2003-2004</u>
Engineering Labor	\$10,000	\$10,000
Installation Labor	\$15,000	\$15,000
<u>Contractor Labor</u>	<u>\$425,000</u>	<u>\$225,000</u>
Job Total	\$450,000	\$250,000

ALTERNATIVES:

EFFECT OF DEFERRAL:

PROJECT HISTORY:

CAPITAL PROJECT JUSTIFICATION 2003-2004

JOB.NO:

IGS03-S

W.O. #03-93810-0

TITLE:

FLAME SCANNER REPLACEMENT

DESCRIPTION:

Replacement of Bailey Flame Scanners with more reliable and better performing scanners.

JUSTIFICATION:

OBSOLESCENCE

WHAT IS OBSOLETE:

Bailey Flame Scanners

WHY OBSOLETE:

Parts are difficult to obtain.

WHEN OBSOLETE:

July 2003

WHY IS IT STILL NEEDED:

Flame scanners are required for proper operation of the burner management system.

ADDITIONAL DETAIL:

One scanner sight tube was broken and no replacements were available. If the remaining sight tube is damaged, it will be impossible to align the mirrors. The circuit boards are obsolete and I&C must replace components on the boards. The scanner mirrors are being changed every outage. This project will replace the aging Bailey Flame Scanners with a newer technology which will be selected from offerings of Coen, IrisEye, FireEye, ABB, Forney, Fossil Power systems, and Ametek. This would commence with Unit 2 during the 2004 scheduled outage along with the burner upgrade and finish with Unit 1 in 2005.

The flame scanners need refurbishing every outage, especially for mirror replacement. It's getting difficult to get parts for the Bailey scanners. New flame scanners are much better at discriminating between the coal and oil flames and between the opposed wall burner flames. They can monitor and detect each flame type separately by frequency spectrum.

Significant advances in scanner technology, since initial installation, now afford us

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IGS03-S

## CAPITAL PROJECT JUSTIFICATION 2003-2004

valuable alternatives for ignition and scanner performance improvement. Currently we must manually jumper the scanner or turn up the gain on oil flames, then readjust after the coal flames are ignited. I&C technicians dedicated to the flame scanners are always required during startup.

### COST ESTIMATE:

	03-04	04-05
Engineering Labor	\$ 25,000	20000
Installation Labor	\$ 30000	30000
Contractor Labor	\$ 105000	105000
Material	\$ 260000	260000
Job Total	\$ 420000	415000

### ALTERNATIVES:

If we do nothing, it become difficult to interface our old Bailey Flame scanners with the new DCS. All the DCS vendors have recommended getting new flame scanners to improve the automatic functioning of the boiler control system.

### EFFECT OF DEFERRAL:

Continued I&C intervention required on startup and extensive outage overhauls of the existing scanners.

### PROJECT HISTORY:

None.

JOB NO:  
#02-49452-00

IGS01-23

W.O.

TITLE: BOILER FEED PUMP RERATE

DESCRIPTION: Modifying and installing up-rated boiler feed pumps.

JUSTIFICATION: ECONOMIC

RATE OF RETURN: 62%  
PAYBACK PERIOD: 1.7 years  
BENEFIT/COST RATIO: 4.42  
ECONOMIC LIFE: 10 years  
PV SAVINGS: \$1,281,307  
SALVAGE VALUE: \$0

ADDITIONAL DETAIL: This project will replace the existing main boiler feed pumps and the spare feed pump with the improved and up-rated pumps. This change will increase the capacity of the existing pumps to match the required flow at the new unit output.

COST ESTIMATE:

	<u>2001-2002, 2B</u>	<u>2002-2003, 1A &amp; 1B</u>	<u>2003-2004, 2A &amp; Spare</u>
Engineering Labor	\$ 1,000	2,000	1,000
IPSC Labor	\$ 1,000	2,000	1,000
Contractor Labor	\$ 0	0	0
Material	\$ <u>106,000</u>	<u>373,000</u>	<u>374,000</u>
Job Total	\$ 108,000	377,000	376,000

ALTERNATIVES: None identified at this time.

EFFECT OF DEFERRAL:

Continue high bearing vibration and the risk of unit derate.

PROJECT HISTORY:

The Unit 2 B boiler feed pump and Unit 1 A and B boiler feed pumps have been replaced.



JOB NO:  
#03-93810-0

IGS03-09

W.O.

TITLE: FLAME SCANNER REPLACEMENT

DESCRIPTION: Replacement of Bailey Flame Scanners with more reliable and better performing scanners.

JUSTIFICATION: OBSOLESCENCE

WHAT IS OBSOLETE:

Bailey Flame Scanners

WHY OBSOLETE:

Parts are difficult to obtain.

WHEN OBSOLETE:

July 2003

WHY IS IT STILL NEEDED:

Flame scanners are required for proper operation of the burner management system.

ADDITIONAL DETAIL:

Parts are difficult to obtain and in some cases not available. One scanner sight tube was broken and no replacements were available. If the remaining sight tube is damaged, it will be impossible to align the mirrors. The circuit boards are obsolete and I&C must replace components on the boards. The flame scanners need refurbishing every outage, especially for mirror replacement.

Replacement flame scanners have additional capabilities that will improve operation of the system. New flame scanners are much better at discriminating between the coal and oil flames and between the opposed wall burner flames. They can monitor and detect each flame type separately by frequency spectrum.

Significant advances in scanner technology, since initial installation, now afford us valuable alternatives for ignition and scanner performance improvement. Currently we must manually jumper the scanner or turn up the gain on oil flames, then readjust after the coal flames are ignited. I&C technicians dedicated to the flame scanners are always required during startup.

COST ESTIMATE:

	<u>2003-2004</u>	<u>2004-2005</u>
Engineering Labor	\$ 25,000	20,000
IPSC Labor	\$ 30,000	30,000
Contractor Labor	\$ 105,000	105,000
Material	\$ <u>260,000</u>	<u>260,000</u>
Job Total	\$ 420,000	415,000

ALTERNATIVES:

If we do nothing, it becomes difficult to interface our old Bailey Flame scanners with the new DCS. All the DCS vendors have recommended getting new flame scanners to improve the automatic functioning of the boiler control system.

EFFECT OF DEFERRAL:

Continued I&C intervention required on startup and extensive outage overhauls of the existing scanners.

PROJECT HISTORY:

None.



JOB NO.:

IGS04-8

W.O. #04-16783-0

TITLE:

UNIT OXYGEN PROBE REPLACEMENT SYSTEM

DESCRIPTION:

This project replaces the present COSA oxygen probe system on the boiler with a multiple position 16 probe system on the boiler economizer outlet area.

JUSTIFICATION:

ECONOMIC

PAYBACK PERIOD: 2.1 years

BENEFIT/COST RATIO: 3.45

ECONOMIC LIFE: 10 years

PV SAVINGS: \$440,750

SALVAGE VALUE: \$0

RATE OF RETURN: 49%

ADDITIONAL DETAIL:

The present oxygen indication system has become unreliable over the last two years. The maintenance requirements have continued to escalate on this system as the probe failures have continued to increase. This has caused the unit operator to run the unit without accurate O2 indication. In these situations we can run with too much airflow causing us to be inefficient, which has been the case most of the time or low airflow which can cause a combustion problem with the boiler. The new design will have eight probes on the east side and eight probes on the west side at varying depths to provide a more accurate averaged signal from each side. We will then be able to receive an accurate indication of the stratification that is present in the economizer outlet and provide an accurate averaged signal to the operators.

COST ESTIMATE:

	<u>2004-2005</u>	<u>2005-2006</u>
Engineering Labor	\$5,000	\$5,000
IPSC Labor	\$0	\$0
Contractor	\$35,000	\$35,000
Material	\$140,000	\$140,000

ALTERNATIVES: Job Total \$180,000 \$180,000  
Continue to use existing inaccurate indicators.

EFFECT OF DEFERRAL: Maintenance and replacement costs continue to increase. Parts are difficult to obtain in a timely manner. This year parts on the last two orders have taken 142 days and 43 days to receive.

PROJECT HISTORY: None.